

SEALED

UNITED STATES DISTRICT COURT

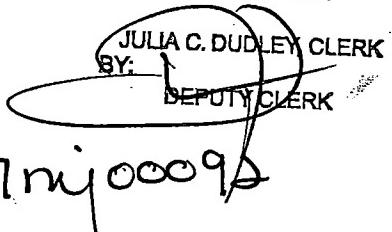
for the
Western District of Virginia

In the Matter of the Search of
 (Briefly describe the property to be searched
 or identify the person by name and address)

Residence, offices, research lab, and vehicles
 associated with Yiheng Percival Zhang

Case No.

7:17-mj-00092


 JULIA C. DUDLEY CLERK
 BY:
 DEPUTY CLERK
APPLICATION FOR A SEARCH WARRANT

I, a federal law enforcement officer or an attorney for the government, request a search warrant and state under penalty of perjury that I have reason to believe that on the following person or property (identify the person or describe the property to be searched and give its location):

1.) 304 Seitz Hall, 155 Ag Quad Lane, Blacksburg, Virginia 24061, 2.) 301A HABB1, 1230 Washington Street SW, Blacksburg, Virginia 24061, 3.) 311 HABB1, 1230 Washington Street SW, Blacksburg, Virginia 24061, 4.) 3107 Alice Dr

located in the Western District of Virginia, there is now concealed (identify the person or describe the property to be seized):
 see attachment B

The basis for the search under Fed. R. Crim. P. 41(c) is (check one or more):

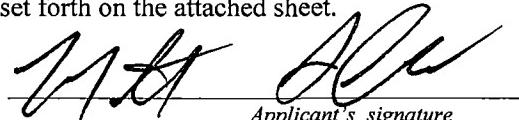
- evidence of a crime;
- contraband, fruits of crime, or other items illegally possessed;
- property designed for use, intended for use, or used in committing a crime;
- a person to be arrested or a person who is unlawfully restrained.

The search is related to a violation of:

<i>Code Section</i>	<i>Offense Description</i>
18 U.S.C. 371, 287, 1001, 1028A, 1343, 1832	Conspiracy to commit offense or to defraud the United States, Criminal False Claims, False Statements, Aggravated Identity Theft, Wire Fraud Theft of Trade Secrets

The application is based on these facts:
 see attached affidavit

- Continued on the attached sheet.
- Delayed notice of _____ days (give exact ending date if more than 30 days: _____) is requested under 18 U.S.C. § 3103a, the basis of which is set forth on the attached sheet.

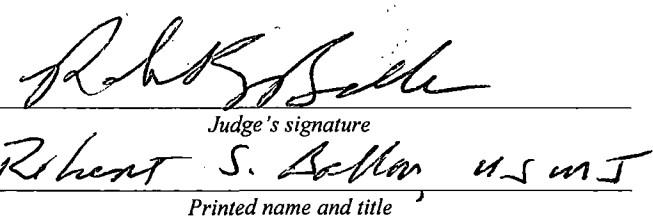

 Applicant's signature

 Matthew S. Secklers, Special Agent, FBI
 Printed name and title

Sworn to before me and signed in my presence.

Date: September 19, 2017

City and state: Roanoke, VA


 Judge's signature
 Robert S. Belcher, U.S. M.J.
 Printed name and title

**AFFIDAVIT IN SUPPORT OF
AN APPLICATION FOR A SEARCH WARRANT**

I, Matthew S. Seckers, being first duly sworn, hereby depose and state as follows:

INTRODUCTION AND AGENT BACKGROUND

1. I am a Special Agent with the Federal Bureau of Investigation (FBI) and have been so employed since June 2009. As part of my duties, I conduct national security investigations related to counterintelligence and counterproliferation and have participated in the execution of multiple search warrants resulting in the seizure of computers, electronic media, digital storage devices, and physical evidence.

2. I respectfully submit this affidavit in support of an application for a search warrant for premises controlled by the Virginia Polytechnic Institute and State University, a public research university located in Blacksburg, Virginia (Virginia Tech) and assigned to Yiheng Percival Zhang AKA Y.H. Percival Zhang (P. Zhang) including offices and a research lab, known vehicles used by P. Zhang, as well as his residence and business address located at 3107 Alice Drive, Blacksburg, Virginia 24060. The locations to be searched are described in the following paragraphs and in Attachment A. This affidavit is made in support of an application for a search warrant under 18 U.S.C. § 1343 and 371, and 18 U.S.C. § 1832 and 371, for information further described in Section I of Attachment B. Upon seizure of items described in Section I of Attachment B, government-authorized persons will review that information to locate the information described in Section II of Attachment B.

3. The statements in this affidavit are based on my personal knowledge and information obtained from the National Science Foundation Office of Inspector General (NSF-OIG), the U.S. Department of Energy Office of Inspector General (DOE-OIG), the United States

Citizenship and Immigration Services (USCIS), other FBI investigations, as well as information received from persons with knowledge regarding relevant facts, and from personal review of records and documents.

4. This affidavit is intended to show there is sufficient probable cause for the requested warrant and does not set forth all of my knowledge about this matter. I have set forth only those facts necessary to establish probable cause to believe the company Cell-Free Bioinnovations, Inc. (CFB), and three individuals, P. Zhang, Zhiguang Zhu (Zhu), and Chun You (You): caused false statements and certifications to be submitted to NSF and DOE in violation of 18 U.S.C. § 1001; submitted false claims to NSF and DOE in violation of 18 U.S.C. § 287 (criminal false claims); conspired to, and engaged in a scheme to defraud NSF and DOE, in violation of 18 U.S.C. § 1343 (wire fraud) and 371 (conspiracy); fraudulently used the identification of individual(s) in the application of proposals to NSF and DOE in violation of 18 U.S.C. § 1343 and 1028A (aggravated identity theft); and, conspired to, and engaged in a scheme to steal trade secrets, in violation of 18 U.S.C. § 1832 (theft of trade secrets) and 18 U.S.C. § 371 (conspiracy).

5. As explained below, there is probable cause to search the locations described in Attachment A for evidence, instrumentalities, contraband or fruits of the above-listed crimes, further described in Attachment B.

CASE BACKGROUND

Relevant CFB Technologies

6. As set forth in this affidavit, this matter involves two primary investigative issues: (1) grant fraud and (2) theft of trade secrets. The two investigative issues center on several different CFB technologies, some of which are highlighted below:

Technology	Key Investigative Issue
Inositol	
Sugar Phosphate	
Bio-Battery	Grant Fraud
Arabinose	
CO2	
Tagatose	Theft of Trade Secrets

On or about November 26, 2012, CFB was incorporated in Virginia. According to NSF proposal IIP-1549018, CFB focuses on “low-cost production of bioelectricity, biohydrogen, and a number of nutrients, sweeteners, and sugar-based compounds/drugs.” Some of CFB’s commercial processes included the production of inositol, sugar phosphate, arabinose, and tagatose from starch for the advancement of human and/or animal health. CFB’s bio-battery technology focused on the generation of electricity from sugars. The CO2 project focused on the production of formic acid, a preservative and antibacterial agent used in livestock feed, from renewable sugars and high-concentration carbon dioxide released by power stations.

The Subjects

7. P. Zhang is currently a Professor in the Department of Biological Systems Engineering at Virginia Tech. He is the Founder and Chief Scientific Officer (CSO) of CFB and was also the Founder and CSO of the now-dissolved Gate Fuels, Inc. (GFI). As of January 21, 2016, P. Zhang was listed as a Principal Investigator (PI) at the Tianjin Institute of Industrial Biotechnology (TIIB) in China on a TIIB website. P. Zhang appears to maintain an affiliation with TIIB, as indicated on a website for the 7th International Forum on Industrial Bioprocessing, May 21-24, 2017, in Wuxi, China, which listed “Prof. Yiheng Percival Zhang, Tianjin Institute of

Industrial Biotechnology” as a speaker. A publicly-available speaker profile for P. Zhang on the University of California, Riverside website in reference to a November 20, 2015 seminar stated P. Zhang was “an affiliated researcher of Chinese Academy of Sciences – Tianjin Institute of Industrial Biotechnology (China)” and founded “three Chinese start-up companies.”

8. According to P. Zhang’s Biographical Sketch provided to NSF and DOE, P. Zhang received Bachelor’s and Master’s degrees in Biochemical Engineering from the East China University of Science and Technology in 1993 and 1996, respectively, and a Ph.D. in Chemical & Biochemical Engineering from Dartmouth College (Dartmouth) in 2002.

9. According to immigration records obtained by NSF-OIG from USCIS: P. Zhang was born in Wuhan, China on April 29, 1971; he became a naturalized United States citizen on May 13, 2011; and, he has been employed by Virginia Tech since approximately August 2005 and held a postdoctoral appointment at Dartmouth from approximately June 2002-August 2005.

10. In his capacity as a Professor at Virginia Tech, P. Zhang had access to Virginia Tech office and laboratory facilities. In an August 4, 2017 email to me, P. Zhang’s Department Head, Mary Leigh Wolfe (Wolfe), informed me that P. Zhang has access to offices at 304 Seitz Hall, 155 Ag Quad Lane, Blacksburg, Virginia 24061 and 301A Human and Agricultural Biosciences Building 1, 1230 Washington Street SW, Blacksburg, Virginia 24061 and a laboratory at 311 Human and Agricultural Biosciences Building 1, 1230 Washington Street SW, Blacksburg, Virginia 24061.

11. Zhu is currently an Investigator at TIIB as listed on a TIIB website. According to his LinkedIn profile as of April 17, 2017, Zhu was PI and Chief Technology Officer at CFB from July 2013-June 2016; a Research Assistant at Virginia Tech from August 2009-May 2013, and

August 2007-May 2009; a Master's student at Virginia Tech from 2007-2009; and, a Ph.D. student at Virginia Tech from 2009-2013.

12. According to Zhu's Biographical Sketch provided to both NSF and DOE, Zhu received a Bachelor's degree in Biotechnology from Huazhong University of Science & Technology in China in 2007, and a Master's degree and a Ph.D. in Biological Systems Engineering from Virginia Tech in 2009 and 2013, respectively. Zhu's Biographical sketch also listed P. Zhang as Zhu's Ph.D. advisor.

13. According to information obtained from USCIS, Zhu has had lawful permanent resident (LPR) status in the United States since 2014. Prior to his LPR status, Zhu held nonimmigrant student status with permission to work under the Optional Practical Training Program.

14. You is currently an Investigator at TIIB as listed on a TIIB website. According to his LinkedIn profile as of April 17, 2017, You was Chief Scientist at CFB from April 2013-March 2016; a Senior Research Associate at Virginia Tech from April 2012-March 2016; and, a Postdoc at Virginia Tech from April 2010-April 2012.

15. According to You's Biographical Sketch provided to NSF, You received a Bachelor's degree in Life Science and a Ph.D. in Genetics from Fudan University in China in 2003 and 2009, respectively. You's Biographical Sketch also listed P. Zhang as You's postdoctoral advisor.

16. According to information obtained from USCIS, You has had LPR status in the United States since 2015. Prior to his LPR status, You initially entered the United States with nonimmigrant J-1 status and changed from J-1 to H1-B status in 2014.

P. Zhang's United States Companies

17. On or about August 31, 2010, GFI was incorporated in Virginia. According to NSF proposal IIP-1346312, the company focused on "developing microbial technology that enables sustainable production of biofuels and biomaterials using a group of organisms including the species *Bacillus subtilis* and the genus *Geobacillus*."

18. Per NSF and DOE proposal and award documents, GFI is affiliated with addresses at 3107 Alice Drive, Blacksburg, Virginia, 411 and 418 Latham Hall, Blacksburg, Virginia, and 2200 Kraft Drive, Suite 1200B, Blacksburg, Virginia.

19. P. Zhang served as PI on NSF Phase I award IIP-1214895 to GFI, which was effective July 1-December 31, 2012. On or about March 21, 2013, P. Zhang wrote to the cognizant NSF Program Officer Dr. Prakash Balan (Balan) from ypzhang@gatefuels.com with ypzhang@vt.edu cc'd that CFB was formed from GFI.

20. On or about July 17, 2013, P. Zhang wrote to Balan from ypzhang@vt.edu: "As the PI of the NSF Phase I award (IIP-1214895), I am writing this letter to request the approval of transferring all rights including the relevant intellectual property from Gate Fuels Inc. pertaining to cell-free biosystems to Cell-Free Bioinnovations Inc. (CFB9) and to issue CFB9 with all rights to submit the NSF SBIR II proposal."

21. In a July 1, 2016 email to NSF-OIG using ypzhang@vt.edu with zhustar2003@gmail.com cc'd, P. Zhang wrote, "the company [CFB] just moved from [Virginia Tech's Corporate Research Center (CRC)] to the basement of my house".

22. In applications to NSF and DOE, CFB represented it rented space at 1800 Kraft Drive, Suite 222, Blacksburg, Virginia from CRC. In NSF and DOE proposal and award documents, CFB is also affiliated with addresses at 418 Latham Hall, Blacksburg, Virginia and 2200 Kraft Drive, Suite 1200B, Blacksburg, Virginia.

23. According to a search of the records database Accurint, which allows access to public and non-public data, as of May 19, 2017, P. Zhang's home residence was 3107 Alice Drive, Blacksburg, Virginia since approximately 2002.

24. In a July 18, 2016 email from ypzhang@vt.edu to NSF-OIG in response to an NSF-OIG subpoena, P. Zhang wrote, "This company [GFI] has been closed officially in March 2016 with help of lawyer [sic]. Because no one is working in this company and key IPs were acquired by Arbiom."

25. According to the Commonwealth of Virginia State Corporation Commission website accessed on July 18, 2017, CFB was registered with the principal office located at 3107 Alice Drive, Blacksburg, Virginia 24060. This address is listed as the residence owned by P. Zhang and Rui Feng (Feng) on the Montgomery County, Virginia Real Estate Information and Property Records Search website accessed on August 1, 2017.

26. Feng is listed as the Chief Office Officer and/or Chief Financial Officer for CFB on multiple NSF/DOE grant applications. Feng is P. Zhang's wife.

SBIR/STTR Programs

27. NSF is an independent federal agency which makes awards in science, technology, education, and math-related fields.

28. DOE is an independent federal agency with a mission to ensure the United States' security and prosperity by addressing energy, environmental, and nuclear challenges through transformative science and technology solutions, to include making research awards.

29. The Small Business Innovation Research (SBIR) program was established by Congress in 1982 to provide increased opportunities for small businesses to participate in research and development to increase employment, and to improve competitiveness in the United States. The intended purpose of the SBIR program is to encourage small businesses to engage in federal Research and Development (R&D) projects which have potential for commercialization.

30. The Small Business Technology Transfer (STTR) program was established by the Small Business Technology Transfer Act of 1992. Government agencies with R&D budgets of \$1 billion or more are required to set aside a portion of these funds to finance the STTR activity. The goal of the STTR program is to facilitate the transfer of technology developed by a research institution through the entrepreneurship of a small business concern.

31. The primary difference between the SBIR and STTR programs is that the STTR program requires a team approach, in which the small business partners with a collaborating research institution (CRI), such as a university. The CRI must receive a minimum of 30 percent of the award funds and perform a minimum of 30 percent of the research.

32. The Small Business Administration (SBA) oversees these programs, and issues policy directives applicable to all federal agencies that administer awards under these programs, setting forth all mandated eligibility criteria.

33. Each federal agency that participates in the SBIR/STTR programs issues its own solicitations and policies, which implement SBA's program criteria. In particular, NSF and DOE

issue SBIR/STTR awards through research grants.

34. At NSF and DOE, SBIR/STTR awards are divided into two phases. Phase I is a feasibility study to determine suitability of further research with regard to a particular topic. It generally lasts six months to twelve months and is funded with an amount between \$70,000 and \$225,000, depending on the awarding agency. Phase II consists of expansion and development of the technology investigated in Phase I, typically lasts two years, and is funded with an amount between \$300,000 and \$1 million, depending on the awarding agency. An individual company must have submitted a successful final report upon conclusion of Phase I to receive a Phase II award.

35. NSF requires that all SBIR/STTR proposals, interim, and final reports generally be filed and submitted electronically through NSF's electronic submission system known as "FastLane." At all times relevant to this affidavit, the FastLane computer server was physically located in Virginia. For future paragraphs of this affidavit that reference the submission of proposals, interim reports, and final reports to NSF, please note that all such submissions were generally made electronically through NSF's FastLane System, as mandated.

36. During the relevant timeframe, proposals to DOE were electronically submitted through an electronic system called Grants.gov, which serves as a portal for grant proposals to DOE. At all times relevant to this affidavit, the computer servers for Grants.gov were physically located in Virginia.

37. NSF personnel have official email addresses ending with the domain name of "@nsf.gov." At all relevant times, NSF email addresses were hosted by an NSF email server located in the Microsoft Office 365 Cloud. For all future paragraphs of this affidavit that reflect

email correspondence sent to or from NSF program personnel, please note that all such e-mails sent to or by personnel at NSF were sent through an email server located in the Microsoft Office 365 Cloud.

38. Generally, the federal government issues payments under the SBIR/STTR programs via electronic transfer. For example, NSF electronically requests payment through the Department of Treasury's Financial Management Service (FMS), located in Kansas City, Missouri. FMS then authorizes payment through a Federal Reserve Bank, and the money is transferred from the Federal Reserve Bank to the awardee's bank account. DOE utilizes the Automated Standard Application for Payments (ASAP) system to allow for quick and secure disbursements to awardees. The Department of the Treasury provides this service to federal agencies and their awardees. Federal agencies enroll awardees in ASAP, authorize payments, and manage awardees' accounts. Once an awardee is enrolled in ASAP, it requests payments from pre-authorized accounts. At all times relevant to this affidavit, federal SBIR/STTR grant award payments were electronically transferred from the associated federal agency, through the Department of Treasury, and then wired to a business bank account identified by the awardee.

39. At NSF, each SBIR/STTR proposal is to be signed, dated, and certified, with the small business representing itself as meeting all eligibility criteria. The small business is to provide true and accurate information about the company throughout the proposal, to include the company's size, personnel, anticipated budget, work plan, commercialization, and outside investment information. NSF relies upon the accuracy of certified proposal submissions to ensure the small business meets the eligibility criteria for the program, and also to evaluate the merits of the proposals.

40. The SBIR/STTR programs allow for a reasonable profit or fee, which generally

does not exceed seven percent (7%) of the total award. For example, the NSF SBIR/STTR award conditions allow a maximum profit/fee of seven percent (7%) of the budget in all SBIR/STTR awards as proposed and as approved by NSF.

41. Furthermore, each NSF proposal contains the following certification: "By signing and submitting this proposal, the Authorized Organizational Representative or Individual Applicant is: (1) certifying that statements made herein are true and complete to the best of his/her knowledge; and (2) agreeing to accept the obligation to comply with NSF award terms and conditions if an award is made as a result of this application ... Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U.S. Code, Title 18, Section 1001)."

42. NSF also requires certified interim and final project reports, stating that the "work for which payment is hereby requested was done in accordance with the award terms and conditions" and that "willful provision of false information or concealing a material fact in this report or any other communication submitted to NSF is a criminal offense."

43. NSF requires Phase I SBIR/STTR grantees to attend mandatory in-person training during the Phase I award period to communicate program mandates in clear terms through written and oral presentations. Records of the NSF SBIR/STTR program show that P. Zhang and Zhu attended the mandatory NSF Phase I SBIR/STTR Grantees Conference in Arlington, Virginia as follows:

Workshop Date	Attendee	Awardee Company
September 26-27, 2012	P. Zhang	GFI
March 10-12, 2014	Zhu	CFB

This conference provided Phase I grantees with information regarding SBIR/STTR program eligibility requirements, and the budgeting and accounting system requirements (including

timekeeping) required of NSF SBIR/STTR grantees. The program included a presentation by NSF-OIG discussing the award criteria and associated certifications, and informing Phase I grantees of the criminal and civil consequences of providing false information to NSF in proposals and reports, of misrepresenting eligibility criteria, and of using the grant funds for personal use and expenses not associated with the purpose of the underlying grant.

44. NSF Phase II submissions must undergo a financial capability review. CFB's Phase II capability review was performed by the Cost Analysis and Audit Resolution (CAAR) Branch prior to its Phase II award. This financial capability review included a review of CFB's accounting and timekeeping systems whereby CFB submitted a sample timesheet.

45. In order to receive additional, incremental funding under NSF Phase II awards, awardees must provide Milestone Charts reporting project expenditures and the level of effort of the PI and other key personnel with each report submission. At all times relevant to this affidavit, the SBIR/STTR Phase II General Grant Conditions required the reporting of estimated expenditures in Interim Reports and "the actual expenditures for the entire project" in the Final Report. Truthfulness in the reports was and is material to the United States Government. Accordingly, the truth as to representations in the reports is generally required to be certified, by the applicant acknowledging he or she understands that it is a crime to provide false information or to omit material information.

SUMMARY OF RELEVANT PORTION OF INVESTIGATION

46. For the reasons explained further herein, the government seeks permission to search for physical and electronic evidence located at 304 Seitz Hall, 155 Ag Quad Lane, Blacksburg, Virginia 24061, 301A Human and Agricultural Biosciences Building 1, 1230 Washington Street SW, Blacksburg, Virginia 24061, 311 Human and Agricultural Biosciences

Building 1, 1230 Washington Street SW, Blacksburg, Virginia 24061, and 3107 Alice Drive, Blacksburg, Virginia 24060.

47. Per the following chart, since February 19, 2013, CFB received five SBIR/STTR awards with funding received totaling \$1,108,348:

Award Number	Funding Agency	Title	Start Date	Expiration Date	Funding Received
DE-SC0009659	DOE	Biological CO ₂ Fixation for the Production of Formic Acid Powered by Sugars	February 19, 2013	April 30, 2014	\$150,000
IIP-1321528	NSF	STTR Phase I: High-Yield Hydrogen Production from Biomass Sugars by Cell-Free Biosystems for Mobile Electricity Generation	July 1, 2013	December 31, 2014	\$225,000
IIP-1353266	NSF	SBIR Phase II: High-Power and High-Energy-Density Enzymatic Fuel Cell through an In Vitro Synthetic Enzymatic Pathway	April 1, 2014	March 31, 2016	\$584,083

DE-SC0013229	DOE	Production of a Zero Calorie Sweetener L-Arabinose from Biomass D-Xylose by an Enzyme Cocktail	February 17, 2015	November 16, 2015	\$149,265
IIP-1549018	NSF	STTR Phase I: Low-Cost Biosynthesis of Sugar Phosphates via ATP-Free Enzyme Cocktails	January 1, 2016	December 31, 2016	\$0 (Award suspended and terminated prior to release of any award funds)

48. Virginia Tech received subawards from CFB under DOE awards DE-SC0009659 and DE-SC0013229 and NSF awards IIP-1321528 and IIP-1353266. This subaward work was performed at Virginia Tech and, according to Wolfe, P. Zhang supervised the work.

49. In addition to the funding listed above, CFB has also received state of Virginia Center for Innovative Technology (CIT) SBIR matching funds for \$50,000 in fiscal year (FY) 2015 and STTR matching funds for \$49,999 in FY 2014. Specifically, the \$50,000 was received under an application entitled "Developing a Sugar Biobattery Prototype with High-Power and High-Energy-Density," similar to the title of NSF award IIP-1353266, and was to be effective July 1-December 31, 2015, during the NSF award IIP-1353266 period. According to an online CIT presentation dated November 2014, one of the eligibility criteria for the SBIR/STTR Matching Funds Programs was "Applicants must have received an SBIR or STTR Phase I or II award from a federal agency or submitted a proposal in CY2014 and are awaiting award decision."

THE SCHEME

Applications for Work Already Completed

50. A violation of 18 U.S.C. § 1343 occurs when a person “having devised or intending to devise any scheme or artifice to defraud, or for obtaining money or property by means of false or fraudulent pretenses, representations, or promises, transmits or causes to be transmitted by means of wire...communication in interstate commerce, any writings...for the purpose of executing such scheme or artifice.” A violation of 18 U.S.C. § 287 occurs when a person “makes or presents...to any department or agency [of the United States], any claim upon or against the United States, or any department or agency thereof, knowing such claim to be false, fictitious, or fraudulent.” Additionally, a violation of 18 U.S.C. § 371 occurs when “two or more persons [to] conspire...to defraud the United States...in any manner or for any purpose, and one or more of such persons do any act to effect the object of the conspiracy.” As set forth below in more detail, I have evidence that P. Zhang, Zhu, and You conspired to submit grant requests for work already completed in China. I have additional evidence that an email from P. Zhang which directed this scheme crossed state lines.

51. On June 11, 2015, P. Zhang, from ypzhang@vt.edu, wrote to Edwin Rogers (Rogers), former CFB Chief Executive Officer (CEO) and Board Member, and Dr. Daniel Wichelecki (Wichelecki), former CFB Senior Scientist, with You cc'd at yoshion@vt.edu:

“Indeed, nearly all experiments in SBIR I (inositol) have been finished; ; Dr. You and I have filed a Chinese patent on behalf of ourselves (no relation to CFB). I think that inositol project will be licensed to some Chinese company within a short time...Now we submit this SBIR proposal. If it is funded, most of SBIR I will be used for CFB to support the other projects... About sugar phosphate project, the experiments have been

conducted by one of my collaborators and my satellite lab in China. The technology transfer will occur in China only. If this project is funded by STTR, most of money will be used to fund the other project in CFB, too."

52. Inositol-specific SBIR proposals were submitted by CFB to NSF on the following dates, with the following PIs and dispositions:

Proposal Number	PI	Submission Date	Authorized Organizational Representative (AOR)	Disposition
IIP-1548342	You	June 14, 2015	You	Withdrawn
IIP-1548815	You	June 16, 2015	You	Declined
IIP-1621085	Katie Whalen	December 7, 2015	Zhu	Withdrawn

In each of the electronic submissions above, CFB sought NSF funding for work which had already been completed. Based on his June 11, 2015 email, it appears P. Zhang sought to benefit a Chinese company through the inositol technology.

53. P. Zhang wrote sugar phosphate-specific NSF proposal IIP-1549018, a CFB application for which the work had already been completed in China. Based on his June 11, 2015 email, it appears P. Zhang sought to benefit China through the sugar phosphate technology. On May 2, 2015, from email account ypzhang@vt.edu, P. Zhang wrote to Wichelecki an email entitled, "First draft proposal of sugar phosphates" with a document entitled, "Project Description v1.0.docx" attached.

54. From ypzhang@vt.edu, P. Zhang wrote to Wichelecki on May 18, 2015, concerning the NSF sugar phosphate project:

"What we expect here is to get this free money and use a half of money [sic] to do what you want to do – make sweeteners. Another half will be used to pay VT graduate students to finish this project."

55. On June 5, 2015, from ypzhang@vt.edu, P. Zhang wrote to Wichelecki with Zhu cc'd at zhustar@vt.edu, "I try [sic] to submit your [sugar phosphate] proposal to NSF fast lane. But I messed up the password. Can you help reset it up and send it to me?" Wichelecki responded the same day to ypzhang@vt.edu with zhustar@vt.edu cc'd, "I reset everything, but kept the password the same. You should be able to login now." P. Zhang subsequently responded the same day from ypzhang@vt.edu, "Dan, Thanks. I am getting in now."

56. On June 16, 2015, Wichelecki exchanged emails with P. Zhang and Zhu about the submission of sugar phosphate-specific NSF proposal IIP-1549018.

57. Specifically, Wichelecki wrote to P. Zhang at ypzhang@vt.edu:
"Also, for submission [of the sugar phosphate NSF proposal], is everything on fastlane up-to-date or do I need to reupload [sic] all the files from this version, if so can you send the segments separately?"

P. Zhang responded from ypzhang@vt.edu, "Enclose this one. If you check everything well, we can let Zhiguang to submit the proposal." P. Zhang attached the document "\$ entire proposal.pdf" to his email. Zhu subsequently responded from zzhu@cfb9.com, "Yes. I can do that. But I may still need all the updated documents just in case something has been changed online." Next, Wichelecki replied to Zhu:

"I [sic] looks like all of the documents were updated on FastLane so it should be good to go. I just click "Submit STTR" on the Proposal Actions page, right? Let me know if that is all that is needed for submission and I'll get it done."

Zhu subsequently responded to Wichelecki, "If you have checked everything and they are all good to go, you can submit it. Yes, just click submit STTR button."

58. Sugar phosphate-specific NSF proposal IIP-1549018 was submitted June 16,

2015. P. Zhang's email address ypzhang@vt.edu is listed on the proposal Cover Page, in P. Zhang's Biographical Sketch, and in a Letter of Support provided by P. Zhang, who was the proposed Co-PI via a subcontract to Virginia Tech. Zhu signed proposal IIP-1549018 as the AOR.

59. In a September 17, 2015 email from Wichelecki to Rogers with P. Zhang cc'd at ypzhang@vt.edu, Wichelecki wrote with respect to sugar phosphate-specific NSF proposal IIP-1549018, "... I did not primarily write the grant (I was still at [the University of Illinois at Urbana-Champaign] and just edited it)..."

60. P. Zhang used the Virginia Tech email service, which is hosted by Google. Balan provided NSF-OIG email correspondence he had with P. Zhang in which P. Zhang used the ypzhang@vt.edu address. NSF-OIG searched the IP addresses contained in the metadata of three emails sent to Balan from ypzhang@vt.edu from 2014-2016 using the publicly-available WHOIS IP Lookup Tool. It appeared P. Zhang's emails involved IP addresses located in different states. Thus, I have probable cause to believe P. Zhang's June 11, 2015 email crossed state lines.

61. The sugar phosphate and inositol proposals were all electronically submitted to NSF for the purpose of receiving federal funding. P. Zhang wrote and directed Zhu to submit the sugar phosphate proposal knowing the work had already been completed in China; Zhu certified this proposal as AOR. Additionally, You and Zhu certified the inositol proposals as AOR, with at least You knowing the work had already been completed. Based on P. Zhang's June 11, 2015 email and the subsequent submissions of the sugar phosphate and inositol grant applications to NSF, I have probable cause to believe that P. Zhang, Zhu, and You conspired to defraud NSF of award funds for work that had already been completed.

False Statements Concerning Time and Effort Reporting

62. A violation of 18 U.S.C. § 1001 occurs when a person “makes or uses any false writing or document knowing the same to contain any materially false, fictitious, or fraudulent statement or entry.” Additionally, a violation of 18 U.S.C. § 371 occurs when “two or more persons conspire...to defraud the United States...in any manner or for any purpose, and one or more of such persons do any act to effect the object of the conspiracy.” As set forth below, I have evidence that P. Zhang and Zhu participated in conduct that satisfies the elements of one or both of the crimes described above with respect to time and effort reporting.

63. Zhu signed the proposal for NSF Phase II award IIP-1353266 on July 30, 2013 as the AOR. The “Certification for Authorized Organization Representative (or Equivalent) or Individual Application” section of the proposal Certification Page signed by Zhu stated, “Willful provision of false information in this application and its supporting documents or in reports required under an ensuing award is a criminal offense (U.S. Code, Title 18, Section 1001).”

64. As a part of its CAAR review for NSF Phase II award IIP-1353266, CFB was required to submit a Financial Management Systems Questionnaire (FMSQ) and a sample timesheet to NSF. The FMSQ was signed by Zhu and appears to have been dated January 2, 2014. In the FMSQ, CFB claimed it had appropriate accounting and timekeeping systems. Adequate accounting and timekeeping systems are material to the decision to fund NSF SBIR Phase II awards.

65. John Glass (Glass), Principal for RM Advisory Services LLC, requested and reviewed CFB documentation during the CAAR review. In a letter from Glass to Zhu dated January 15, 2014, Glass requested the FMSQ, among other documentation. Using the email address zhustar2003@gmail.com on January 20 and 21, 2014, Zhu wrote to Glass and provided

documentation and information for the CAAR review.

66. NSF relied upon the representations CFB made about its timekeeping systems. Specifically, the independent certified public accountants who reviewed CFB's FMSQ and sample timesheet reported back to NSF, "The company's sample timesheet...is adequate for documenting effort expended by its employees on various activities and related charges."

67. The sample timesheet appeared to show Zhu's hours for November 2013. The timesheet was divided into two pages: one for November 1-15, 2013, and the other for November 16-30, 2013. The timesheet listed projects "NSF-IIP-1321528" and "DE-SC0009659" but only recorded hours for "DE-SC0009659." The timesheets appear to have been signed by Zhu on November 16, 2013, and December 1, 2013, and by P. Zhang on November 22, 2013, and December 1, 2013.

68. NSF-OIG issued subpoenas to CFB seeking general ledgers, time and effort reports, and timesheets. P. Zhang provided responses to the subpoenas, which NSF-OIG received on August 16, 2016 and November 15, 2016.

69. In response to the subpoenas, P. Zhang provided two timesheet documents to NSF-OIG on November 15, 2016, via ypzhang@vt.edu: "0 timesheet-CFB 2013-2016-1.pdf" and "0 timesheet-CFB 2013-2016-2.pdf".

70. The timesheets provided by P. Zhang in response to the subpoenas did not match the timesheet provided to NSF during the CAAR review for NSF Phase II award IIP-1353266. Specifically, timesheets provided by P. Zhang in response to the subpoenas were quarterly and did not specify which projects employees worked on.

71. Zhu's October-December 2013 quarterly timesheet provided by P. Zhang in response to the subpoenas did not match his November 2013 timesheet provided to CAAR.

Zhu's quarterly timesheet provided by P. Zhang in response to the subpoenas listed no hours on November 11, 26, and 27, 2013, while his timesheet provided to CAAR listed eight hours for "DE-SC0009659" on each of those three days. The quarterly timesheet appears to have been signed by Zhu and P. Zhang and dated January 2, 2014.

72. On November 23, 2016, NSF-OIG emailed P. Zhang at ypzhang@vt.edu and asked: "Do you have any additional timesheets that track an employee's time by the project(s) worked on? If so, please provide those as well." P. Zhang responded the same day from ypzhang@vt.edu:

"We do not have such documents. Because we are a small company and scientists have no accounting background, we do not prepare such documents like big companies."

73. P. Zhang's November 23, 2016 response contradicts the timesheet CFB provided to NSF during the CAAR review for NSF Phase II award IIP-1353266, which P. Zhang and Zhu signed.

74. P. Zhang's November 23, 2016 response to NSF-OIG also contradicts the GFI timesheets provided to NSF-OIG by Xiaozhou Zhang, former GFI PI, in response to an NSF-OIG subpoena. The GFI timesheets maintained for P. Zhang's prior small company, which covered July 2011-Janauary 2013, allocated hours to specific federal projects and other jobs worked on. P. Zhang signed the GFI timesheets as an employee or supervisor.

75. The proposal for DOE award DE-SC0009659 was submitted October 15, 2012. In the proposal, P. Zhang was proposed as the Virginia Tech subcontract Co-PI and ypzhang@vt.edu was listed in the Cover Page, Research & Related Senior/Key Person Profile (Expanded) section, P. Zhang's Biographical Sketch, and in a Letter of Support from P. Zhang.

76. The proposal for DOE award DE-SC0013229 was submitted October 13, 2014.

In the proposal, P. Zhang, the Co-PI, listed ypzhang@vt.edu in the Research & Related Senior/Key Person Profile (Expanded) section, in what appears to be a Cover Page, and in P. Zhang's Biographical Sketch. In the Budget Justification, Zhu is listed as PI, You is listed as Senior Scientist, and Virginia Tech is listed as the CRI.

77. For DOE awards DE-SC0009659 and DE-SC0013229, P. Zhang on behalf of GFI and Zhu on behalf of CFB, respectively, certified prior to the effective dates of the awards that GFI's and CFB's financial management systems distinguished between activities worked on multiple projects. Specifically, P. Zhang and Zhu both certified "If employees work on multiple activities or cost objectives, a distribution of their salaries and wages must be supported by personnel activity reports which...Reflect an after-the-fact distribution of the actual activity of each employee." P. Zhang signed the DE-SC0009659 certification and dated it January 24, 2013 and Zhu signed the DE-SC0013229 certification and dated it January 20, 2015. The timesheets provided by P. Zhang that cover these awards did not, in fact, distribute effort to multiple activities.

78. Based upon P. Zhang's timesheet production to NSF-OIG in response to the subpoenas, I have probable cause to believe that the timesheet signed by both P. Zhang and Zhu and submitted to NSF during the CAAR review was false. Additionally, I have probable cause to believe that the certification signed by Zhu that was provided to DOE for award DE-SC0013229 was also false, as CFB did not maintain timesheets that distinguished between activities worked on multiple projects from February 2013-June 2016, the period covered by P. Zhang's timesheet production.

False Certifications on NSF Phase II Award

79. A violation of 18 U.S.C. § 1343 occurs when person "having devised or

intending to devise any scheme or artifice to defraud, or for obtaining money or property by means of false or fraudulent pretenses, representations, or promises, transmits or causes to be transmitted by means of wire...communication in interstate commerce, any writings...for the purpose of executing such scheme or artifice." A violation of 18 U.S.C. § 287 occurs when a person "makes or presents...to any department or agency [of the United States], any claim upon or against the United States, or any department or agency thereof, knowing such claim to be false, fictitious, or fraudulent." Additionally, a violation of 18 U.S.C. § 371 occurs when "two or more persons [to] conspire...to defraud the United States...in any manner or for any purpose, and one or more of such persons do any act to effect the object of the conspiracy." As set forth below, I have evidence that P. Zhang and Zhu participated in conduct that satisfies the elements of one or more of these crimes with respect to NSF award IIP-1353266.

80. NSF award IIP-1353266 (AKA "bio-battery project") was effective April 1, 2014-March 31, 2016. Interim Reports were submitted electronically to NSF on September 11, 2014, May 14, 2015, and November 3, 2015, and the Final Report was submitted electronically to NSF on May 30, 2016. The three Interim Report submissions resulted in additional payments to CFB based upon CFB's certifications.

81. In each of the reports listed above, CFB was required to fill out certifications in order for the report to be approved for additional payments. Two certifications included "The work for which payment is hereby requested was performed in accordance with the award terms and conditions and that payment is due and has not been previously requested" and "All of the funds committed to this award, including all associated supplemental awards, have been fully expended as designated in the grant budget." CFB selected "Yes" in response to both questions for its Interim Reports and Final Report for NSF award IIP-1353266.

82. Zhu signed the certifications for NSF award IIP-1353266 as both Authorized Company Officer (ACO) and PI for Interim Reports 1-3. Zhu digitally signed the Final Report Certifications as PI and P. Zhang digitally signed as ACO using ypzhang@vt.edu. The certifications signed by Zhu and P. Zhang stated:

I understand that the willful provision of false information or concealing a material fact in this report or any other communication submitted to NSF is a criminal offense (U.S. Code, Title 18, Section 1001).

83. P. Zhang is listed as Co-Investigator in Interim Reports 2 and 3 and the Final Report for NSF award IIP-1353266 with ypzhang@vt.edu.

84. You is listed as Staff Scientist in the Final Report for NSF award IIP-1353266 with yoshion@vt.edu.

85. For NSF award IIP-1353266, the Final Report Milestone Chart reported \$196,026 of expenditures paid to Virginia Tech for “Subawards.” The Milestone Chart was a requisite part of the Final Report that Balan approved in order to release payment, but NSF withheld this payment to CFB following a recommendation from NSF-OIG.

86. The CFB award ledgers as of July 30, 2016, showed only \$147,019.50 of payments to Virginia Tech in reference to NSF award IIP-1353266’s subaward.

87. NSF-OIG sent Virginia Tech a subpoena on June 24, 2016, and requested, among other documentation, subcontract agreements with and payments received from CFB.

88. In Virginia Tech’s response received by NSF-OIG on July 25, 2016, Virginia Tech invoiced CFB for and received only \$147,019.50 under the NSF award IIP-1353266 subaward as of June 29, 2016.

89. Balan provided NSF-OIG an email he received from P. Zhang on January 25,

2017; P. Zhang wrote this email to Balan from ypzhang@vt.edu. In the email, P. Zhang requested the status of the final payment for NSF award IIP-1353266 and attached an invoice from Virginia Tech for \$49,006.50 covering the period March 1, 2015-September 30, 2016. Thus, as of January 25, 2017, Virginia Tech had not been paid \$196,026, as was represented by Zhu and P. Zhang when they certified that all of the funds committed to the award had been fully expended as designated in the grant budget.

90. According to one of the general ledgers provided by P. Zhang in response to the subpoenas, Hui Ma (Ma), purported to be CFB's Vice President of Marketing, was paid from NSF award IIP-1353266 grant funds even though no funds had been allocated for him in the approved budget. Ma was also not reported as having worked on the project in the Milestone Charts. According to Ma's signed CFB offer letter also provided by P. Zhang in the response to the subpoenas, "Your responsibility as Vice President is to extend business opportunity [sic] of the Company in China, in particular, synthetic starch made from cellulosic biomass, along with the coproduction of other biofuels and value-added biochemicals."

91. Additionally, in the NSF award IIP-1353266 Final Report, CFB represented to NSF that Wichelecki worked on the project and "Performed experiments." In the Final Report Milestone Chart, CFB represented Wichelecki was paid \$15,464.37 from the award for months 18-24.

92. In the May 4, 2017 interview, when NSF asked Wichelecki if he ever worked on the bio-battery project, he answered, "Not at all, no."

93. Based upon the records provided by CFB to both NSF and NSF-OIG and NSF-OIG's interview with Wichelecki, I have probable cause to believe that Zhu's and P. Zhang's certifications that CFB complied with award terms and conditions and spent award funds in

accordance with the approved budget were false.

Violation of STTR Eligibility Criteria

94. A violation of 18 U.S.C. § 1001 occurs when a person “makes or uses any false writing or document knowing the same to contain any materially false, fictitious, or fraudulent statement or entry.” As set forth below, I have evidence that Zhu participated in conduct that satisfies the elements of this crime with respect to DOE STTR award DE-SC0013229.

95. In the proposal for DOE award DE-SC0013229, CFB certified “Yes” to “In the joint research and development proposed in this project, does the small business perform at least 40% of the work and the research institution named in the application perform at least 30% of the work?” Zhu signed the proposal as the Authorized Representative on October 13, 2014 and selected “I agree” to the following:

By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious. Or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. [sic] (U.S. Code, Title 18, Section 1001)

96. On February 3, 2015, DOE Contract Specialist Michael Neff (Neff) emailed Zhu and asked, “Please confirm whether you applied to another Federal agency for funding, specify which agency to which you applied, and confirm that your application to this agency for similar work not funded [sic]”; Neff referenced conflicting statements provided by CFB in its application about essentially equivalent work submitted to other agencies. Zhu responded to Neff the same day from zhustar2003@gmail.com on behalf of zzhu@cfb9.com, “...we applied NSF

SBIR I last year using this arabinose project and it was rejected. The similar work was never funded.”

97. Contrary to the certification in the proposal for DOE award DE-SC0013229, Virginia Tech only appears to have been paid for approximately 18% of the work per CFB’s award ledger rather than the required 30% for STTR awards. The approved budget of \$149,265 for DOE award DE-SC0013229 included a \$48,843 subaward to Virginia Tech, but CFB’s ledger and supporting documents received by NSF-OIG on August 16, 2016 only showed \$27,311.29 in payments to Virginia Tech.

98. In Virginia Tech’s response to the subpoena received by NSF-OIG on July 25, 2016, there were two unpaid invoices to CFB totaling approximately \$19,000 that appear related to DOE award DE-SC0013229. Virginia Tech’s records as of June 29, 2016, well after the November 16, 2015 end date for DOE award DE-SC0013229, only showed \$27,311.29 received from CFB.

99. At least part of that discrepancy may be accounted for in CFB’s general ledger for DOE award DE-SC0013229. That document, provided by P. Zhang, showed \$11,000 being transferred to another CFB account, into which NSF award funds were deposited, on March 18, 2015, as reimbursement for a “sign up bonus” paid to You when he joined CFB.

100. You’s offer letter provided by P. Zhang in response to the subpoenas stated, “Your signing bonus is \$11,000, which will be paid in March 1, 2015.”

101. On the “Final Schedule of Costs by Element & Certification” for DOE award DE-SC0013229, Zhu signed the document and dated it May 30, 2016, stating, “a minimum of 30% of the funding, excluding any purchased or leased equipment, materials, and supplies, must be allocated to the research institution,” despite the contrary information in CFB’s general ledgers

and Virginia Tech's records.

102. According to the DOE award DE-SC0013229 general ledger, CFB received its final DOE payment on October 29, 2015, for a total of \$149,265 in award funds received. As of June 29, 2016, the last dated entry in the DOE award DE-SC0013229 general ledger, only \$1,784.53 remained from the award funds.

103. Based upon the date Zhu signed the "Final Schedule of Costs by Element & Certification" for DOE award DE-SC0013229 and information obtained from CFB and Virginia Tech concerning payments Virginia Tech received under the award, I have probable cause to believe that Zhu's certification that Virginia Tech completed, and was paid for, the required 30% of STTR award funds was false.

Aggravated Identity Theft

104. A violation of 18 U.S.C. § 1028A occurs when a person, "during and in relation to any felony violation, enumerated in subsection (c) [including wire fraud, 18 U.S.C. § 1343], knowingly transfers, possesses, or uses, without lawful authority, a means of identification of another person." As set forth below, I have evidence that P. Zhang participated in conduct that satisfies the elements of this crime with respect to applications submitted to NSF, possibly to inflate the credentials and profile of CFB's personnel.

105. The proposal for NSF award IIP-1321528 was submitted December 20, 2012. In the proposal, P. Zhang was proposed as the Virginia Tech subcontract Co-PI and ypzhang@vt.edu was listed in the proposal Cover Page and in P. Zhang's Biographical Sketch.

106. On April 12, 2013, from ypzhang@vt.edu, P. Zhang emailed Balan a response to questions and concerns Balan had raised via email on April 8, 2013 for NSF proposal IIP-1321528. P. Zhang attached the document "response – NSF STTR I _20130412.pdf" to his

email, a document which was signed by P. Zhang.

107. The document “response – NSF STTR I _20130412.pdf” noted “CFB9 is hiring a part-time local employee – Don Miller, who is an expert in recombinant protein production and scale-up” and “In addition, we are hiring Donald Miller as a part-time consultant, who has rich experience in industrial enzyme production and scale-up.” A copy of Donald J. Miller’s (Miller’s) resume was attached. Miller’s current position in this resume was ““Retired” Blacksburg, Virginia” from “April 2012 to Present.”

108. The Revised Budget for NSF proposal IIP-1321528, electronically submitted April 19, 2013, stated the following under “Other Personnel”: “This project staffing at Cell-Free Bioinnovations Inc. also includes a fermentation scientist (Ms. FangFang Sun [Sun]) and a principal research engineer (Mr. Donald J. Miller).” The “Other Personnel” section also stated: “Mr. Donald J. Miller will work 2.0 cal. months on this project (line B. 2) at an annual base salary of \$70,000 (\$5833.33 per month, \$33.1 per hour). The requested salary is $\$5833.33 \times 2.0 = \$11,667$.” Sun was budgeted \$27,200, for \$38,867 total budgeted for Senior Personnel when combined with Miller’s budgeted amount.

109. The Revised Budget for NSF proposal IIP-1321528 also included a resume for Miller. Miller’s current position in this resume was “Consultant, Blacksburg, Virginia” from “04/2012 to Present”.

110. NSF proposal IIP-1321528 was awarded on June 17, 2013. The approved budget included \$38,867 for two “Other professionals”.

111. NSF award IIP-1321528 expired on December 31, 2014 and the Final Report was submitted January 21, 2015. The Final Report listed P. Zhang with ypzhang@vt.edu.

112. NSF-OIG reviewed the IIP-1321528 ledger and found no payments to Miller.

NSF-OIG found no payments to Miller in five other CFB ledgers provided by P. Zhang in response to NSF-OIG subpoenas.

113. In response to the subpoenas, P. Zhang provided no personnel documents for Miller indicating Miller had been hired and/or paid by CFB.

114. In addition to NSF award IIP-1321528, Miller was represented as an employee of CFB in other applications to NSF and DOE as follows:

Project	Submission Date	Role	Proposal Disposition
IIP-1353266	July 30, 2013	Part-time employee; "principal process engineer for fermentation"	Awarded
IIP-1448122	June 10, 2014	Part-time employee; "principal process engineer"	Declined
DE-SC0013229	October 13, 2014	Part-time employee; "fermentation associate"	Awarded
IIP-1548342	June 14, 2015		Withdrawn
IIP-1549018	June 16, 2015		Awarded
IIP-1548815			Declined

115. In a June 21, 2015 email from Rogers to P. Zhang, Rogers wrote:

"In addition, CFB has two other part time [sic] employees: Dr. Brett Malone as the business development assistant, and Mr. Don Miller as the fermentation associate.' It is very important to NOT mention individuals who are not actually affiliated with the company. This could cause CFB problems with NSF but also with the named individuals."

P. Zhang responded to Rogers' email from ypzhang@vt.edu on June 22, 2015, "Get the points. Thanks."

116. On May 4, 2017, Rogers provided NSF-OIG a July 1, 2015 email he sent to Miller at dmille3690@aol.com in which Rogers stated:

"...our records indicate you signed a Restricted Stock Purchase Agreement (RSPA) in May 2013 for 160 shares. The cumulative purchase price of these shares was \$16. I have

checked with the company's current and former leadership and there does not appear to be a record of your paying for the shares. If no payment was made, it would appear that you did not go through with the purchase of the shares and therefore own no shares."

Rogers also told NSF-OIG via email on May 4, 2017:

"he [Miller] and I met one time, and he agreed that he had not earned any stock in Cell-Free. It appears that his work with Cell-Free ended in April 2014, well before I started doing part-time consulting work with the company."

117. Rogers also emailed P. Zhang on July 2, 2015, "It is very important to NOT list Don Miller...on any more grant applications." P. Zhang responded to Rogers' email from ypzhang@vt.edu on July 1, 2015, "We will list their names any more [sic]."

118. On June 16, 2017, NSF-OIG emailed and telephonically interviewed Miller. Miller stated he "didn't recognize any major distinction" between GFI and CFB. NSF-OIG told Miller he was budgeted \$11,667 on NSF award IIP-1321528 as a "principal research engineer," but Miller told NSF-OIG he was never hired by GFI or CFB and did not receive any payments from GFI or CFB. He stated that he helped review proposals, went to some laboratory meetings, helped with a few fermentations, and showed someone how to run a fermenter. NSF-OIG provided Miller the July 2013-June 2015 proposal submission dates which listed Miller as a CFB employee, and Miller said he would check his emails for when he was affiliated with GFI and CFB. Miller said he did not give anyone permission to use his name or list him as a CFB employee after his affiliation with the company ended.

119. On June 16, 2017, following the NSF-OIG interview, Miller emailed NSF-OIG six email communications he had involving GFI or CFB. In a February 15, 2014 email from Miller to former CFB CEO Joseph Rollin (Rollin), Miller requested employment documents

from Rollin but said Miller was never provided any and explained “I believe by this time I had already written off the idea of receiving payment for my time but figured perhaps they might eventually amount to something down the road so an equity position seemed like the best way to proceed.” With respect to the February 15, 2014 email, Miller wrote to NSF, “This is some of the last correspondence I had with anyone on Campus so naturally interested to find out from NSF that they were involving me in grant proposals over a year later.” Three communications provided by Miller referenced an April 11, 2014 meeting Miller was to have with Rollin, about which Miller stated he “never had any dealings with anyone after this meeting other than some guy from Charlottesville who was visiting to tell me/confirm I had no stake in anything since he had no records of any stock options ever being granted to me.” Miller provided two emails that referenced an August 14, 2015 meeting with Rogers as the “last I have heard from anyone about any of it until you wrote me today.”

120. As discussed above, P. Zhang authored the NSF sugar phosphate proposal IIP-1549018 and directed the electronic submissions of NSF sugar phosphate proposal IIP-1549018 and inositol proposals IIP-1548342 and IIP-1548815 per his June 11, 2015 email. These three proposals represented Miller, without his consent, as an employee of CFB after his affiliation with the company had ended. On two occasions following these submission, P. Zhang was notified about the use of individuals who did not actually work for CFB. Based upon the fraudulent submission of NSF proposals IIP-1549018, IIP-1548342 and IIP-1548815 and the inclusion of Miller, who did not work for CFB at the time of their submissions, I have probable cause to believe that P. Zhang fraudulently used Miller’s identity.

Theft of Trade Secrets

121. A violation of 18 U.S.C. § 1832 occurs when a person “with intent to convert a

trade secret, that is related to a product or service used in or intended for use in interstate or foreign commerce, to the economic benefit of anyone other than the owner thereof, and intending or knowing that the offense will, injure any owner of that trade secret, knowingly...steals, or without authorization appropriates, takes, carries away, or conceals, or by fraud, artifice, or deception obtains such information... without authorization copies, duplicates, sketches, draws, photographs, downloads, uploads, alters, destroys, photocopies, replicates, transmits, delivers, sends, mails, communicates, or conveys such information... receives, buys, or possesses such information, knowing the same to have been stolen or appropriated, obtained, or converted without authorization" or attempts to commit these offenses. A trade secret (1) has actual or potential economic value, (2) is not generally known to the public, and (3) is reasonably protected. Additionally, a violation of 18 U.S.C. § 371 occurs when "two or more persons conspire...to defraud the United States...in any manner or for any purpose, and one or more of such persons do any act to effect the object of the conspiracy." As set forth below, I have evidence that P. Zhang and You participated in conduct that satisfies the elements of the crimes described above with respect to the theft of trade secrets of the production of tagatose, a sugar alternative, from Bonumose Biochem, LLC (Bonumose) for the economic benefit of TIIB, Chinese Academy of Sciences (CAS), and possibly the economy of China.

122. CFB hired Wichelecki in or about July 2015 following his graduation from the University of Illinois at Urbana-Champaign with a Ph.D. in biochemistry and a brief postdoctoral research position. According to Wichelecki, he was hired to work on sugar biotransformations from glucose to tagatose by engineering enzymes.

123. On or about July 13, 2015, Wichelecki developed and/or identified an enzymatic pathway for tagatose production. The information was relayed to P. Zhang in an email entitled

“Alternate Tagatose Idea.”

124. On or about July 13, 2015, from ypzhang@vt.edu, P. Zhang replied to Wichelecki, “I like your idea greatly and believe it should work...Also, your pathway results in high product yield. It is very beautiful...I believe that your idea will let you take over healthy sweeter [sic] market.”

125. In a May 4, 2017 email from Rogers to NSF-OIG, Rogers noted that China has a diabetes problem and:

“China consumes 15.7 grams of sucrose per person per day. The [sic] works out to over 8 million metric tons of sucrose per year. If a mere 1% of that consumption were replaced with tagatose that would mean 160,000 MT/year of tagatose. Even at our market disrupting low price point of \$2,000/MT, that would be revenue of \$160MM/year. A 100% replacement of sucrose would mean \$16 billion/year.”

Thus, tagatose production has great potential economic value.

126. According to Rogers, on or about October 2, 2015, CFB filed a United States Provisional Patent Application for “Enzymatic Synthesis of D-Tagatose.” Wichelecki was listed as the lead inventor and P. Zhang was named as a co-inventor. Thus, this was a preliminary step in providing reasonable protection over the tagatose pathway discovered by Wichelecki.

127. On or about January 18, 2016, Wichelecki, while still a CFB employee, emailed P. Zhang at ypzhang@vt.edu an email entitled, “Thermophilic F6PE Sequences”; “F6PE” is an important and unique enzyme discovered by Wichelecki for the tagatose production pathway, in addition to the enzyme “T6PP,” also discovered by Wichelecki. P. Zhang replied to Wichelecki the same day and cc’d You at yoshion@vt.edu.

128. In a May 4, 2017 interview with Wichelecki, Wichelecki noted the following

concerning the two key enzymes in his tagatose pathway: "...while those are in literature, I would say that they are very, very hard to find on your own without any direction." In a May 4, 2017 interview with Rogers, Rogers noted that Wichelecki had "special knowledge about these – about how to identify these two enzymes and how to make them work in the entire pathway, and that's what he did. And so, um, that information was not readily obtainable from any source other than us or Dr. Zhang..." Thus, part of Wichelecki's tagatose pathway was not generally known to the public.

129. On or about March 8, 2016, P. Zhang submitted an Intellectual Property (IP) Disclosure to Virginia Tech for "Enzymatic Synthesis of D-Tagatose." In the disclosure, P. Zhang listed the "Date This Invention Was Conceived" as April 1, 2015. P. Zhang and Wichelecki are listed as co-inventors, with P. Zhang in his Virginia Tech capacity listed at ypzhang@vt.edu and in his CFB capacity listed at yhpzhang@gmail.com.

130. On or about January 6, 2016, Bonumose was incorporated in Virginia by former CFB employee Rogers. On or about February 12, 2016, Wichelecki's employment with CFB ended and he became the CSO and Board Member of Bonumose. Bonumose planned to pursue further development of the tagatose technology for the commercial market and licensed the technology from CFB.

131. On or about April 1, 2016, CFB assigned a number of assets to Bonumose, including: "All IP RIGHTS related to the production of Tagatose from starch, sucrose, cellulose, or degradation products thereof, including all intermediate steps, and including without limitation the U.S. Provisional Patent Application entitled "Enzymatic Synthesis of D-Tagatose," as well as any subsequent non-provisional patent application, international filings, continuations, divisionals, etc." Rogers, Wichelecki, and P. Zhang all signed this agreement, which states it

“shall be BINDING with respect to all terms.” [emphasis in original] The agreement also states, “This document was drafted by ROGERS and ZHANG as primary negotiators of the Agreement.” Thus, I have probable cause that P. Zhang knew the tagatose technology no longer belonged to him or to CFB after the April 1, 2016 agreement.

132. To continue with the commercialization process of the tagatose technology, Bonumose filed a Patent Cooperation Treaty (PCT) application for “Enzymatic Synthesis of D-Tagatose” and included the People’s Republic of China (PRC) as one of the covered countries on or about September 30, 2016. Thus, this was an additional step in providing reasonable protection over the tagatose pathway discovered by Wichelecki. According to Rogers, P. Zhang did not have access to Bonumose’s PCT application. Additionally, Virginia Tech Intellectual Properties, Inc. assigned any interest Virginia Tech may have had in the tagatose patent applications to Bonumose on or about October 26, 2016.

133. On December 21, 2016, in response to the NSF award IIP-1549018 termination notice, P. Zhang wrote from ypzhang@vt.edu to United States Government officials at NSF, “[Bonumose] utilized NSF and VT plus a lot of untrue allegations to force us to give up two important technologies (e.g., tagatose and sugar phosphates) to them.”

134. On or about April 13, 2017, Rogers and Wichelecki learned of a patent filed in China on or about November 1, 2016 by TIIB with allegedly the same enzymatic pathway discovered by Wichelecki and licensed from CFB on or about April 1, 2016. Rogers and Wichelecki learned of the TIIB patent from CJ CheilJedang, a South Korean food company and tagatose producer. Bonumose was discussing with CJ CheilJedang the possibility of an investment in Bonumose’s manufacturing operations, licensing and distributing Bonumose’s technology, or purchasing the rights to Bonumose’s technology when CJ CheilJedang noted the

existence of the TIIB patent. The TIIB patent included the enzymes F6PE and T6PP from Wichelecki's pathway as "T6E" and "T6P", respectively. The TIIB patent included "two anonymous inventors." Rogers asked P. Zhang via email on April 16, 2017, if he transmitted information regarding the tagatose patent to TIIB. Zhang responded on April 20, 2017 stating that he did not "release the tagatose provisional patent to (TIIB) before or after 4/1/2016." Bonumose hired a law firm in China to assist with protection of their technology in China. The law firm identified the anonymous inventors as "Yiheng ZHANG" and "Chun YOU" on or about April 24, 2017.

135. While previously employed at CFB, Rogers and P. Zhang exchanged emails about TIIB developing and/or selling the tagatose technology. On or about December 12, 2015, P. Zhang wrote from ypzhang@vt.edu, "If we can get Tianjin to sell our tagatose, we will get up to 40% equity of the company...It is far more than a typical rate of 4% in the USA."

136. Given P. Zhang submitted the TIIB patent anonymously, I have probable cause that P. Zhang, knowing the tagatose technology did not belong to him or CFB following the April 1, 2016 agreement with Bonumose, attempted to hide his identity in his theft of Bonumose's trade secrets.

137. As discussed above, the tagatose pathway discovered by Wichelecki meets the definition of a trade secret. P. Zhang's July 13, 2015 email to Wichelecki indicated P. Zhang saw the benefit of this technology. Based upon the nature of the tagatose pathway as a trade secret; the timing of the transfer of the tagatose technology from CFB to Bonumose on April 1, 2016; the September 30, 2016 PCT application by Bonumose for the tagatose technology; the November 1, 2016 patent filing by TIIB for the same tagatose technology as Bonumose on which P. Zhang and You were inventors; and the December 21, 2016 acknowledgement by P. Zhang to

the United States Government that he had given up the tagatose technology, I have probable cause to believe that P. Zhang knowingly stole the tagatose technology for “the economic benefit of another other than the owner” and to the injury of the rightful owner, Bonumose.

Probable Cause for Premises to be Searched

138. Based on my training and experience, as well as discussions I have had with other agents, I am informed that individuals involved in criminal activity including false claims, identity theft, wire fraud, and theft of trade secrets may store the instrumentalities of their crimes in their homes and offices. Based upon P. Zhang’s use and/or control of premises listed below, I have probable cause to believe that physical and digital records will be stored at those premises.

139. Based on my knowledge, training, and experience, researchers keep physical copies of documents such as journal entries, laboratory notebooks, general notes, and printed spreadsheets, for reference and review, to track, record, collect, collate, and analyze data, as well as to identify all steps taken, and resources used. This allows them to keep track of their work and attribute resources allocated on various projects to specific funding streams provided for their research. These documents and/or other physical copies, also provide mobility during the research process and during travel for collaborative meetings, academic conferences, and/or business presentations.

140. Based on my knowledge and experience, I submit that, it is also likely that P. Zhang used cellular phones, computers, or other electronic storage medium on these premises to conduct research and request funding. Based on my knowledge, training, and experience, I know that digital files or remnants of such files can be recovered months or even years after they have been downloaded onto a storage medium, deleted, or viewed via the Internet. Electronic files downloaded to a storage medium can be stored for years at little or no cost. Even when files

have been deleted, they can be recovered months or years later using forensic tools. This is so because when a person “deletes” a file on a computer, the data contained in the file does not actually disappear; rather, that data remains on the storage medium until it is overwritten by new data.

141. Therefore, deleted files, or remnants of deleted files, may reside in free space or slack space—that is, in space on the storage medium that is not currently being used by an active file—for long periods of time before they are overwritten. In addition, a computer’s operating system may also keep a record of deleted data in a “swap” or “recovery” file.

142. Wholly apart from user-generated files, computer storage media—in particular, computers’ internal hard drives—contain electronic evidence of how a computer has been used, what it has been used for, and who has used it. To give a few examples, this forensic evidence can take the form of operating system configurations, artifacts from operating system or application operation, file system data structures, and virtual memory “swap” or paging files. Computer users typically do not erase or delete this evidence, because special software is typically required for that task. However, it is technically possible to delete this information.

143. Similarly, files that have been viewed via the Internet are sometimes automatically downloaded into a temporary Internet directory or “cache.”

144. **Forensic evidence.** As further described in Attachment B, this application seeks permission to locate not only physical and digital files that might serve as direct evidence of the crimes described in the warrant, but also for forensic electronic evidence that establishes how cellular phones and/or computers were used, the purpose of their use, who used them, and when. There is probable cause to believe that this forensic electronic evidence will be on any storage medium on the premises because:

145. Data on the storage medium can provide evidence of a file that was once on the storage medium but has since been deleted or edited, or of a deleted portion of a file (such as a paragraph that has been deleted from a word processing file). Virtual memory paging systems can leave traces of information on the storage medium that show what tasks and processes were recently active. Web browsers, e-mail programs, and chat programs store configuration information on the storage medium that can reveal information such as online nicknames and passwords. Operating systems can record additional information, such as the attachment of peripherals, the attachment of USB flash storage devices or other external storage media, and the times the computer was in use. Computer file systems can record information about the dates files were created and the sequence in which they were created, although this information can later be falsified.

146. Forensic evidence on a cellular phone, computer, or storage medium can also indicate who has used or controlled the computer or storage medium. This “user attribution” evidence is analogous to the search for “indicia of occupancy” while executing a search warrant at a residence. For example, registry information, configuration files, user profiles, e-mail, e-mail address books, “chat,” instant messaging logs, photographs, the presence or absence of malware, and correspondence (and the data associated with the foregoing, such as file creation and last-accessed dates) may be evidence of who used or controlled the computer or storage medium at a relevant time.

147. A person with appropriate familiarity with how a cellular phone and/or a computer works can, after examining this forensic evidence in its proper context, draw conclusions about how the cellular phones/computers were used, the purpose of their use, who used them, and when.

148. The process of identifying the exact files, blocks, registry entries, logs, or other forms of forensic evidence on a storage medium that are necessary to draw an accurate conclusion is a dynamic process. While it is possible to specify in advance the records to be sought, computer evidence is not always data that can be merely reviewed by a review team and passed along to investigators. Whether data stored on a computer is evidence may depend on other information stored on the computer and the application of knowledge about how a computer behaves. Therefore, contextual information necessary to understand other evidence also falls within the scope of the warrant.

149. Further, in finding evidence of how a cellular phone/computer was used, the purpose of its use, who used it, and when, sometimes it is necessary to establish that a particular thing is not present on a storage medium. For example, the presence or absence of counter-forensic programs or anti-virus programs (and associated data) may be relevant to establishing the user's intent.

150. I know that when an individual uses a cellular phone or a computer during the commission of a crime, the individual's electronic device will generally serve both as an instrumentality for committing the crime, and also as a storage medium for evidence of the crime. The cellular phone/computer is an instrumentality of the crime because it is used as a means of committing the criminal offense. The cellular phone/computer is also likely to be a storage medium for evidence of crime. From my training and experience, I believe that a cellular phone/computer used to commit false claims, identity theft, wire fraud, and theft of trade secrets violations may contain: data that is evidence of how the cellular phone/computer was used; data that was sent or received; notes as to how the criminal conduct was achieved; records of Internet discussions about the crime; and other records that indicate the nature of the offense.

151. *Necessity of seizing or copying entire cellular phones, computers, or storage media.*

In most cases, a thorough search of a premises for information that might be stored on storage media often requires the seizure of the physical storage media and later off-site review consistent with the warrant. This is true because of the following:

152. *The time required for an examination.* As noted above, not all evidence takes

the form of documents and files that can be easily viewed on site. Analyzing evidence of how a cellular phone/computer has been used, what it has been used for, and who has used it requires considerable time, and taking that much time on premises could be unreasonable. As explained above, because the warrant calls for forensic electronic evidence, it is exceedingly likely that it will be necessary to thoroughly examine storage media to obtain evidence. Storage media can store a large volume of information. Reviewing that information for things described in the warrant can take weeks or months, depending on the volume of data stored, and would be impractical and invasive to attempt on-site.

153. *Foreign languages.* Investigation conducted to date has identified the potential

for documents, files, etc., to be written in a foreign language such as Mandarin or Chinese. Due to resources required to review and translate files and data in a foreign language, more time is required to effectively process the seized information.

154. *Technical requirements.* Cellular phones and computers can be configured in

several different ways, featuring a variety of different operating systems, application software, and configurations. Therefore, searching them sometimes requires tools or knowledge that might not be present on the search site. The vast array of computer hardware and software available makes it difficult to know before a search what tools or knowledge will be required to analyze the system and its data on the premises. However, taking the storage media off-site and

reviewing it in a controlled environment will allow its examination with the proper tools and knowledge.

155. ***Variety of forms of electronic media.*** Records sought under this warrant could be stored in a variety of storage media formats that may require off-site reviewing with specialized forensic tools.

156. Upon review of documents and/or information obtained during the course of the investigation, premises used and/or currently under control by P. Zhang in the course of his academic research and/or research to develop technologies that were later commercialized by his companies were identified as follows:

- a.) Virginia Tech Office 1: 304 Seitz Hall, 155 Ag Quad Lane, Blacksburg, Virginia 24061- This location was identified as P. Zhang's assigned office space by his supervisor on or about August 4, 2017.
- b.) Virginia Tech Office 2: 301A Human and Agricultural Biosciences Building 1, 1230 Washington Street SW, Blacksburg, Virginia 24061 – This location was identified as P. Zhang's lab office by his supervisor on or about August 4, 2017.
- c.) Virginia Tech Research Lab: 311 Human and Agricultural Biosciences Building 1, 1230 Washington Street SW, Blacksburg, Virginia 24061 – This location was identified as P. Zhang's assigned research lab by his supervisor on or about August 4, 2017.
- d.) Home Residence and CFB Business Address: 3107 Alice Drive, Blacksburg, Virginia 24060- This location was confirmed as P. Zhang's residence via 2017 Montgomery County, Virginia, tax records searched on August 10, 2017. A vehicle registered to P. Zhang and his spouse was observed at the residence on or about July 31, 2017.

e.) Additionally, the following vehicles have been identified as registered to, and/or observed being operated by P. Zhang:

1. Toyota Sienna Van-Virginia Plates KGY-2530

A records check on 07/18/2017 identified the vehicle being registered to Yi heng Percival Zhang. P. Zhang was observed operating the vehicle on multiple occasions between 08/14/2017-08/18/2017

2. Toyota Camry Sedan-Virginia Plates KBB-3347

A records check on 07/18/2017 identified the vehicle being registered to Yi heng Percival Zhang

3. Nissan Sedan-North Carolina Plates EKT-2447

P. Zhang was observed operating the vehicle on 09/13/2017.

CONCLUSION

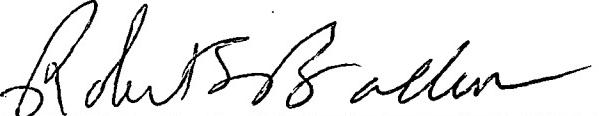
157. Based on the foregoing, I respectfully request that the Court issue the proposed search warrants. Because the warrants will be served on the premises of Virginia Tech, reasonable cause exists to permit the execution of the requested warrants at any time in the day or night, and search of the residence be permitted during daylight hours.

Respectfully submitted,



Matthew S. Seckers
Special Agent
Federal Bureau of Investigation
Richmond Division

Subscribed and sworn to before me on September 14, 2017



THE HONORABLE ROBERT S. BALLOU
UNITED STATES MAGISTRATE JUDGE

ATTACHMENT A

Description of Property to Be Searched

These warrants apply to premises located at the following locations, all storage areas, rooms, cabinets, containers, and/or vehicles on the premises and/or associated with the subject, which may hold physical evidence or computers or electronic storage media that may contain evidence:

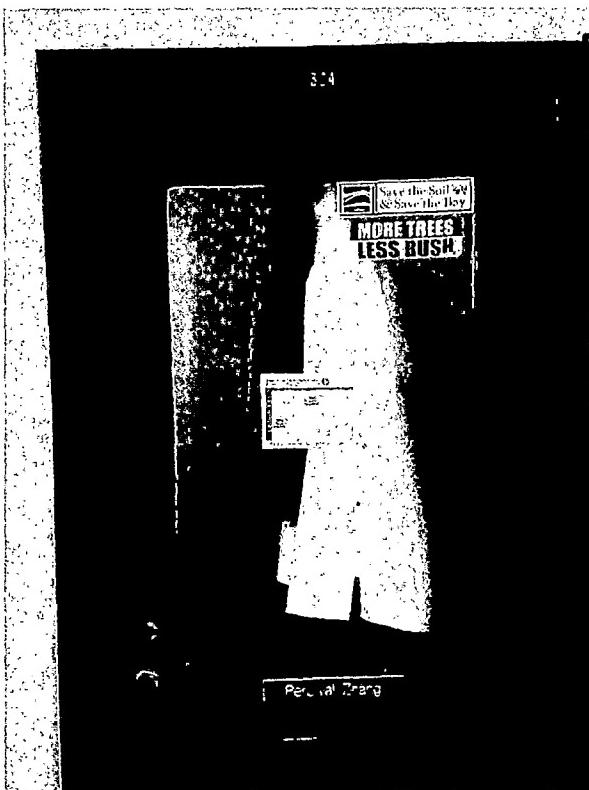
Vehicles: White Toyota Sienna Van-Virginia Plates KGY-2530

White Toyota Camry Sedan- Virginia Plates KBB-3347

Red Nissan Four Door Sedan- North Carolina Plates EKT-2447

Location 1: 304 Seitz Hall, 155 Ag Quad Lane, Blacksburg, Virginia 24061

Description of location: The office is described as a locked office space, clearly marked by visible signs. The office is accessed via the entrance to Seitz Hall and is located on the third floor of the building.



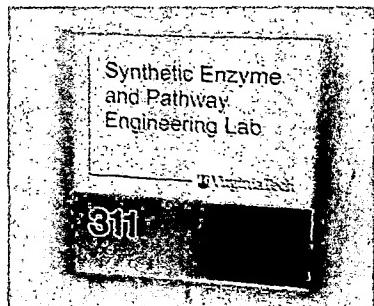
Location 2: 301A Human and Agricultural Biosciences Building 1, 1230 Washington Street SW, Blacksburg, Virginia 24061

Description of location: This location is described as an office inside of general academic building workspace labeled 301 and is clearly marked with a sign. Access is provided through controlled workspace 301.



Location 3: 311 Human and Agricultural Biosciences Building 1, 1230 Washington Street SW, Blacksburg, Virginia 24061

Description of location: This laboratory is located inside of the building identified above and is marked with multiple numerical signs. Access is restricted to the general public and requires electronic card swipe to enter the facility.



Location 4: 3107 Alice Drive, Blacksburg, Virginia 24060

Description of location: This location is described as a brick front, two story home identified by house number located on the front of the residence.





ATTACHMENT B

Particular Things to be Seized and/or Searched

The items to be seized relate to or constitute violations of 18 U.S.C. § 1343 and 371, and 18 U.S.C. § 1832 and 371 and include, but are not limited to, the following: A full and complete physical examination of the seized items for contraband, evidence, and instrumentalities that relate to or constitute violations of referenced statutes, will be conducted, and the forensic examination of computers, digital storage devices, and/or other electronic media will be performed.

I. Physical items or documents

To the extent that premises described in Attachment A contain possessions currently or previously owned or operated by P. Zhang, You, or Zhu:

- a. **All documents, files, photographs, U.S. and foreign passports, etc., that may provide evidence and/or investigative context related to violations described above.**

b. **Cellular Phones, Computers, Electronic Storage Devices, and Electronic Media**

1. The authorization to seize and search includes the search of electronic data to include deleted data, remnant data, RAM data, and slack space. The seizure and search of cellular phones, computers, and computer media will be conducted in accordance with the affidavit submitted in support of this warrant.

2. Computer hardware, meaning any and all computer equipment, including any electronic devices that are capable of collecting, analyzing, creating, displaying, converting, storing, concealing, or transmitting electronic, magnetic, optical or similar computer impulses or data. Included within the definition of computer hardware is any data processing hardware (such as central processing units and self-contained laptop or notebook computers); internal and

peripheral storage devices (such as fixed disks, external hard disks, floppy disk drives and diskettes, tape drives and tapes, optical and compact disk storage devices, and other memory storage devices, cameras); peripheral input/output devices (such as keyboards, printers, scanners, plotters, video display monitors, and optical readers); related communications devices (such as modems, wireless routers, cables and connections, recording equipment, RAM and ROM units, acoustic couplers, automatic dialers, speed dialers, programmable telephone dialing or signaling devices, and electronic tone generating devices); and any devices, mechanisms, or parts that can be used to restrict access to such hardware (such as physical keys and locks).

3. Computer software, meaning any and all data, information, instructions, programs, or program codes, stored in the form of electronic, magnetic, optical, or other media, which is capable of being interpreted by a computer or its related components. Computer software may also include data, data fragments, or control characters integral to the operation of computer software, such as operating systems software, applications software, utility programs, compilers, interpreters, communications software, and other programming used or intended to be used to communicate with computer components.

4. Computer-related documentation, meaning any written, recorded, printed, or electronically stored material that explains or illustrates the configuration or use of any seized computer hardware, software, or related items.

5. Computer passwords and data security devices, meaning any devices, programs, or data -- whether themselves in the nature of hardware or software -- that can be used or are designed to be used to restrict access to, or to facilitate concealment of, any computer hardware, computer software, computer-related documentation, or electronic data records. Such items include, but are not limited to, data security hardware (such as encryption devices, chips, and

circuit boards); passwords; data security software or information (such as test keys and encryption codes); and similar information that is required to access computer programs or data or to otherwise render programs or data into usable form.

6. Any computer or electronic records, documents, and materials referencing or relating to the above-described offenses. Such records, documents, or materials, as well as their drafts or modifications, may have been created or stored in various formats, including, but not limited to, any hand-made form (such as writing or marking with any implement on any surface, directly or indirectly); any photographic form (such as microfilm, microfiche, prints, slides, negative, video tapes, motion pictures, or photocopies); any mechanical form (such as photographic records, printing, or typing); any electrical, electronic, or magnetic form (such as tape recordings, cassettes, compact disks); or any information on any electronic or magnetic storage device (such as floppy diskettes, hard disks, USB Drives, CD-ROMs, optical disks, printer buffers, sort cards, memory calculators, electronic dialers, or electronic notebooks), as well as printouts or readouts from any magnetic storage device.

7. Any electronic information or data, stored in any form, which has been used or prepared for use either for periodic or random backup (whether deliberate, inadvertent, or automatically or manually initiated), of any computer or computer system. The form that such information might take includes, but is not limited to, floppy diskettes, fixed hard disks, removable hard disk cartridges, tapes, laser disks, CD-ROM disks, video cassettes, and other media capable of storing magnetic or optical coding.

8. Any electronic storage device capable of collecting, storing, maintaining, retrieving, concealing, transmitting, and using electronic data used to conduct computer or Internet-based communications, or which contains material or data obtained through computer or Internet-based

communications, including data in the form of electronic records, documents, and materials, including those used to facilitate interstate communications, including but not limited to telephone (including mobile telephone) and Internet Service Providers. Included within this paragraph is any information stored in the form of electronic, magnetic, optical, or other coding on computer media or on media capable of being read by a computer or computer-related equipment, such as gaming systems, fixed disks, external hard disks, removable hard disk cartridges, floppy disk drives and diskettes, tape drives and tapes, optical storage devices, laser disks, or other memory storage devices..

c. **Computer and Internet Records**

9. Records of personal and business activities relating to the operation and ownership of the computer systems, such as telephone records, notes (however and wherever written, stored, or maintained), books, diaries, and reference materials.

10. Any records or documents pertaining to accounts held with Internet Service Providers or of Internet use.

11. Any evidence of user attribution (Forensic evidence on a computer or storage medium can also indicate who has used or controlled the computer or storage medium. This “user attribution” evidence is analogous to the search for “indicia of occupancy” while executing a search warrant at a residence. For example, registry information, configuration files, user profiles, e-mail, e-mail address books, “chat,” instant messaging logs, photographs, the presence or absence of malware, and correspondence (and the data associated with the foregoing, such as file creation and last-accessed dates) may be evidence of who used or controlled the computer or storage medium at a relevant time).

12. Documents and records regarding the control/possession/responsibility of the searched premises.

13. The search will include vehicles owned, operated, and/or registered to P. Zhang and/or Feng.

d. Photographs of Search

14. During the course of the search, photographs of the searched premises may also be taken to record the condition thereof and/or the location of items therein.

II. Information to be seized by the government

All information described above in Section I that constitutes fruits, contraband, evidence or instrumentalities of a violation of the federal criminal statutes listed in Paragraph 4 of the affidavit accompanying this warrant application, and for each location listed in Attachment A, information including all computer devices and documents pertaining to the following specific matters from July 1, 2012-present:

- (a) The incorporation, corporate changes, or dissolution of GFI and/or CFB;
- (b) The creation of, maintenance of, or closure of any bank accounts associated with GFI, CFB, P. Zhang, Zhu, or You;
- (c) Business and financial records of GFI and/or CFB, including records of ownership, company filings, tax returns, and company policies;
- (d) The receipt of funds or anything of value by GFI, CFB, Virginia Tech, P. Zhang, Zhu, and You, or anyone acting on its/his behalf with intent to be influenced or to be rewarded in connection with any business, transaction, or series of transactions involving NSF, DOE, or other funding agencies;
- (e) Foreign, federal, and/or state funding applied for and/or awarded to GFI, CFB,

Virginia Tech, P. Zhang, Zhu, or You, including solicitations and proposals;

- (f) Payment requests, invoices, and/or reports filed by GFI, CFB, Virginia Tech, P. Zhang, Zhu, or You;
- (g) Letters of support from or to GFI, CFB, Virginia Tech, P. Zhang, Zhu, or You;
- (h) Employees, independent contractors, consultants, volunteers, other individuals, or companies who were directly or indirectly involved with GFI and/or CFB, including personnel files, appointment/hire letters, timesheets, project code documentation, payroll records, calendars, and appointment books;
- (i) Virginia Tech, or any employees, agents, or students thereof, and its/their dealings with GFI, CFB, P. Zhang, Zhu, or You;
- (j) The use of the 411 and 418 Latham Hall, Blacksburg, Virginia, 2200 Kraft Drive, Suite 1200B, Blacksburg, Virginia, 1800 Kraft Drive, Suite 222, Blacksburg, Virginia, 3107 Alice Drive, Blacksburg, Virginia, 304 Seitz Hall, 155 Ag Quad Lane, Blacksburg, Virginia 24061, 301A Human and Agricultural Biosciences Building 1, 1230 Washington Street SW, Blacksburg, Virginia 24061, 311 Human and Agricultural Biosciences Building 1, 1230 Washington Street SW, Blacksburg, Virginia 24061 addresses and any other physical addresses used by GFI, CFB, P. Zhang, Zhu, or You;
- (k) Communications and documents involving any subcontract, lease agreement, or rental agreement with GFI, CFB, P. Zhang, Zhu, or You;
- (l) The expenditure of award funds by GFI, CFB, P. Zhang, Zhu, or You;
- (m) Training materials received by GFI, CFB, P. Zhang, Zhu, or You, including agendas, books/booklets, and/or name tags;

- (n) Technical papers and/or publications by P. Zhang, Zhu, or You;
- (o) Communications and documents involving the transfer of intellectual property and associated rights between GFI, CFB, Bonumose, and/or TIIB;
- (p) Intellectual property filings by GFI, CFB, TIIB, P. Zhang, Zhu, or You;
- (q) Communications and documents involving affiliations between TIIB and P. Zhang, Zhu, or You;
- (r) Records of foreign travel, including information contained in passports, schedules, itineraries, and tickets; and,
- (s) Correspondence related to federal or state awards, between P. Zhang, Zhu, or You, with funding agencies, with individuals directly or indirectly involved with GFI and/or CFB, and any communications contemplating, discussing, or taking action to cover up previous activity or communications falling within the above categories.